Validated By CRFValidator v 1.0.3

Application No: 10620787 Version No: 3.0

Input Set:

Output Set:

Started: 2008-12-18 20:35:11.391
Finished: 2008-12-18 20:35:16.523
Elapsed: 0 hr(s) 0 min(s) 5 sec(s) 132 ms
Total Warnings: 8
Total Errors: 0
No. of SeqIDs Defined: 34
Actual SeqID Count: 34

Error code		Error Description
W	213	Artificial or Unknown found in <213> in SEQ ID (5)
W	213	Artificial or Unknown found in <213> in SEQ ID (10)
W	213	Artificial or Unknown found in <213> in SEQ ID (15)
W	213	Artificial or Unknown found in <213> in SEQ ID (20)
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W	213	Artificial or Unknown found in <213> in SEQ ID (33)
W	213	Artificial or Unknown found in <213> in SEQ ID (34)

SEQUENCE LISTING

<110> Simard, John
Simms, John J.
Qiu, Zhiyong

<120> Immunogenic Compositions Derived from Poxviruses and Methods of Using Same

<130> 51300-00006

<140> 10620787
<141> 2003-07-15

<150> 60/396,293
<151> 2002-07-15

<160> 34

<170> PatentIn version 3.3

<210> 1
<211> 250
<212> PRT
<213> Vaccinia virus

<400> 1

Met Gly Ala Ala Ala Ser Ile Gln Thr Thr Val Asn Thr Leu Ser Glu
1 5 10 15

Arg Ile Ser Ser Lys Leu Glu Gln Glu Ala Asn Ala Ser Ala Gln Thr
20 25 30

Lys Cys Asp Ile Glu Ile Gly Asn Phe Tyr Ile Arg Gln Asn His Gly
35 40 45

Cys Asn Leu Thr Val Lys Asn Met Cys Ser Ala Asp Ala Asp Ala Gln
50 55 60

Leu Asp Ala Val Leu Ser Ala Ala Thr Glu Thr Tyr Ser Gly Leu Thr
65 70 75 80

Pro Glu Gln Lys Ala Tyr Val Pro Ala Met Phe Thr Ala Ala Leu Asn
85 90 95

Ile Gln Thr Ser Val Asn Thr Val Val Arg Asp Phe Glu Asn Tyr Val
100 105 110

```
Lys Gln Thr Cys Asn Ser Ser Ala Val Val Asp Asn Lys Leu Lys Ile
        115                 120                 125

Gln Asn Val Ile Ile Asp Glu Cys Tyr Gly Ala Pro Gly Ser Pro Thr
    130                 135                 140

Asn Leu Glu Phe Ile Asn Thr Gly Ser Ser Lys Gly Asn Cys Ala Ile
145                 150                 155                 160

Lys Ala Leu Met Gln Leu Thr Thr Lys Ala Thr Thr Gln Ile Ala Pro
                165                 170                 175

Lys Gln Val Ala Gly Thr Gly Val Gln Phe Tyr Met Ile Val Ile Gly
            180                 185                 190

Val Ile Ile Leu Ala Ala Leu Phe Met Tyr Tyr Ala Lys Arg Met Leu
        195                 200                 205

Phe Thr Ser Thr Asn Asp Lys Ile Lys Leu Ile Leu Ala Asn Lys Glu
    210                 215                 220

Asn Val His Trp Thr Thr Tyr Met Asp Thr Phe Phe Arg Thr Ser Pro
225                 230                 235                 240

Met Val Ile Ala Thr Thr Asp Met Gln Asn
                245                 250
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<210> 2
<211> 250
<212> PRT
<213> Vaccinia virus

<400> 2

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Met Gly Ala Ala Ala Ser Ile Gln Thr Thr Val Asn Thr Leu Ser Glu
1               5                   10                  15

Arg Ile Ser Ser Lys Leu Glu Gln Glu Ala Asn Ala Ser Ala Gln Thr
            20                  25                  30

Lys Cys Asp Ile Glu Ile Gly Asn Phe Tyr Ile Arg Gln Asn His Gly
        35                  40                  45

Cys Asn Leu Thr Val Lys Asn Met Cys Ser Ala Asp Ala Asp Ala Gln
    50                  55                  60
```

```
Leu Asp Ala Val Leu Ser Ala Ala Thr Glu Thr Tyr Ser Gly Leu Thr
65                  70                  75                  80

Pro Glu Gln Lys Ala Tyr Val Pro Ala Met Phe Thr Ala Ala Leu Asn
                85                  90                  95

Ile Gln Thr Ser Val Asn Thr Val Val Arg Asp Phe Glu Asn Tyr Val
            100                 105                 110

Lys Gln Thr Cys Asn Ser Ser Ala Val Val Asp Asn Lys Leu Lys Ile
        115                 120                 125

Gln Asn Val Ile Ile Asp Glu Cys Tyr Gly Ala Pro Gly Ser Pro Thr
    130                 135                 140

Asn Leu Glu Phe Ile Asn Thr Gly Ser Ser Lys Gly Asn Cys Ala Ile
145                 150                 155                 160

Lys Ala Leu Met Gln Leu Thr Thr Lys Ala Thr Thr Gln Ile Ala Pro
                165                 170                 175

Arg Gln Val Ala Gly Thr Gly Val Gln Phe Tyr Met Ile Val Ile Gly
            180                 185                 190

Val Ile Ile Leu Ala Ala Leu Phe Met Tyr Tyr Ala Lys Arg Met Leu
        195                 200                 205

Phe Thr Ser Thr Asn Asp Lys Ile Lys Leu Ile Leu Ala Asn Lys Glu
    210                 215                 220

Asn Val His Trp Thr Thr Tyr Met Asp Thr Phe Phe Arg Thr Ser Pro
225                 230                 235                 240

Met Val Ile Ala Thr Thr Asp Met Gln Asn
                245                 250
```

<210> 3
<211> 250
<212> PRT
<213> Variola virus

<400> 3

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Met Gly Ala Ala Ala Ser Ile Gln Thr Thr Val Asn Thr Leu Ser Glu
1               5                  10                  15

Arg Ile Ser Ser Lys Leu Glu Gln Glu Ala Asn Ala Ser Ala Gln Thr
            20                  25                  30

Lys Cys Asp Ile Glu Ile Gly Asn Phe Tyr Ile Arg Gln Asn His Gly
        35                  40                  45

Cys Asn Leu Thr Val Lys Asn Met Cys Ser Ala Asp Ala Asp Ala Gln
    50                  55                  60

Leu Asp Ala Val Leu Ser Ala Ala Thr Glu Thr Tyr Ser Gly Leu Thr
65                  70                  75                  80

Pro Glu Gln Lys Ala Tyr Val Pro Ala Met Phe Thr Ala Ala Leu Asn
                85                  90                  95

Ile Gln Thr Ser Val Asn Thr Val Val Arg Asp Phe Glu Asn Tyr Val
            100                 105                 110

Lys Gln Thr Cys Asn Ser Ser Ala Val Val Asp Asn Lys Leu Lys Ile
        115                 120                 125

Gln Asn Val Ile Ile Asp Glu Cys Tyr Gly Ala Pro Gly Ser Pro Thr
    130                 135                 140

Asn Leu Glu Phe Ile Asn Thr Gly Ser Ser Lys Gly Asn Cys Ala Ile
145                 150                 155                 160

Lys Ala Leu Met Gln Leu Thr Thr Lys Ala Thr Thr Gln Ile Ala Pro
                165                 170                 175

Arg Gln Val Ala Gly Thr Gly Val Gln Phe Tyr Met Ile Val Ile Gly
            180                 185                 190

Val Ile Ile Leu Ala Ala Leu Phe Met Tyr Tyr Ala Lys Arg Met Leu
        195                 200                 205

Phe Thr Ser Thr Asn Asp Lys Ile Lys Leu Ile Leu Ala Asn Lys Glu
    210                 215                 220

Asn Val His Trp Thr Thr Tyr Met Asp Thr Phe Phe Arg Thr Ser Pro
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225 230 235 240

Met Val Ile Ala Thr Thr Asp Ile Gln Asn
245 250

<210> 4
<211> 250
<212> PRT
<213> Variola virus

<400> 4

Met Gly Ala Ala Ala Ser Ile Gln Thr Thr Val Asn Thr Leu Ser Glu
1 5 10 15

Arg Ile Ser Ser Lys Leu Glu Gln Glu Ala Asn Ala Ser Ala Gln Thr
20 25 30

Lys Cys Asp Ile Glu Ile Gly Asn Phe Tyr Ile Arg Gln Asn His Gly
35 40 45

Cys Asn Leu Thr Val Lys Asn Met Cys Ser Ala Asp Ala Asp Ala Gln
50 55 60

Leu Asp Ala Val Leu Ser Ala Ala Thr Glu Thr Tyr Ser Gly Leu Thr
65 70 75 80

Pro Glu Gln Lys Ala Tyr Val Pro Ala Met Phe Thr Ala Ala Leu Asn
85 90 95

Ile Gln Thr Ser Val Asn Thr Val Val Arg Asp Phe Glu Asn Tyr Val
100 105 110

Lys Gln Thr Cys Asn Ser Ser Ala Val Val Asp Asn Lys Leu Lys Ile
115 120 125

Gln Asn Val Ile Ile Asp Glu Cys Tyr Gly Ala Pro Gly Ser Pro Thr
130 135 140

Asn Leu Glu Phe Ile Asn Thr Gly Ser Ser Lys Gly Asn Cys Ala Ile
145 150 155 160

Lys Ala Leu Met Gln Leu Thr Thr Lys Ala Thr Thr Gln Ile Ala Pro
165 170 175

```
Arg Gln Val Ala Gly Thr Gly Val Gln Phe Tyr Met Ile Val Ile Gly
            180                 185                 190

Val Ile Ile Leu Ala Ala Leu Phe Met Tyr Tyr Ala Lys Arg Met Leu
        195                 200                 205

Phe Thr Ser Thr Asn Asp Lys Ile Lys Leu Ile Leu Ala Asn Lys Glu
    210                 215                 220

Asn Val His Trp Thr Thr Tyr Met Asp Thr Phe Phe Arg Thr Ser Pro
225                 230                 235                 240

Met Val Ile Ala Thr Thr Asp Ile Gln Asn
                245                 250
```

<210> 5
<211> 250
<212> PRT
<213> Artificial

<220>
<223> Consensus sequence for SEQ ID NOs. 1-4

<400> 5

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Met Gly Ala Ala Ala Ser Ile Gln Thr Thr Val Asn Thr Leu Ser Glu
1               5                   10                  15

Arg Ile Ser Ser Lys Leu Glu Gln Glu Ala Asn Ala Ser Ala Gln Thr
            20                  25                  30

Lys Cys Asp Ile Glu Ile Gly Asn Phe Tyr Ile Arg Gln Asn His Gly
        35                  40                  45

Cys Asn Leu Thr Val Lys Asn Met Cys Ser Ala Asp Ala Asp Ala Gln
    50                  55                  60

Leu Asp Ala Val Leu Ser Ala Ala Thr Glu Thr Tyr Ser Gly Leu Thr
65                  70                  75                  80

Pro Glu Gln Lys Ala Tyr Val Pro Ala Met Phe Thr Ala Ala Leu Asn
                85                  90                  95

Ile Gln Thr Ser Val Asn Thr Val Val Arg Asp Phe Glu Asn Tyr Val
            100                 105                 110
```

```
Lys Gln Thr Cys Asn Ser Ser Ala Val Val Asp Asn Lys Leu Lys Ile
        115                 120                 125

Gln Asn Val Ile Ile Asp Glu Cys Tyr Gly Ala Pro Gly Ser Pro Thr
    130                 135                 140

Asn Leu Glu Phe Ile Asn Thr Gly Ser Ser Lys Gly Asn Cys Ala Ile
145                 150                 155                 160

Lys Ala Leu Met Gln Leu Thr Thr Lys Ala Thr Thr Gln Ile Ala Pro
                165                 170                 175

Arg Gln Val Ala Gly Thr Gly Val Gln Phe Tyr Met Ile Val Ile Gly
            180                 185                 190

Val Ile Ile Leu Ala Ala Leu Phe Met Tyr Tyr Ala Lys Arg Met Leu
        195                 200                 205

Phe Thr Ser Thr Asn Asp Lys Ile Lys Leu Ile Leu Ala Asn Lys Glu
    210                 215                 220

Asn Val His Trp Thr Thr Tyr Met Asp Thr Phe Phe Arg Thr Ser Pro
225                 230                 235                 240

Met Val Ile Ala Thr Thr Asp Met Gln Asn
                245                 250
```

<210> 6
<211> 110
<212> PRT
<213> Vaccinia virus

<400> 6

```
Met Asp Gly Thr Leu Phe Pro Gly Asp Asp Asp Leu Ala Ile Pro Ala
1               5                   10                  15

Thr Glu Phe Phe Ser Thr Lys Ala Ala Lys Lys Pro Asp Arg Lys Arg
            20                  25                  30

Glu Gln Ile Val Lys Ala Asp Glu Asp Asp Asn Glu Glu Thr Leu Lys
        35                  40                  45
```

```
Gln Arg Leu Thr Asn Leu Glu Lys Lys Ile Thr Asn Val Thr Thr Lys
    50                  55                  60

Phe Glu Gln Ile Glu Lys Cys Cys Lys Arg Asn Asp Glu Val Leu Phe
65                  70                  75                  80

Arg Leu Glu Asn His Ala Glu Thr Leu Arg Ala Ala Met Ile Ser Leu
                85                  90                  95

Ala Lys Lys Ile Asp Val Gln Thr Gly Arg Arg Pro Tyr Glu
            100                 105                 110
```

<210> 7
<211> 110
<212> PRT
<213> Vaccinia virus

<400> 7

```
Met Asp Gly Thr Leu Phe Pro Gly Asp Asp Asp Leu Ala Ile Pro Ala
1               5                   10                  15

Thr Glu Phe Phe Ser Thr Lys Ala Asp Lys Lys Pro Glu Ala Lys Arg
            20                  25                  30

Glu Ala Ile Val Lys Ala Asp Glu Asp Asp Asn Glu Glu Thr Leu Lys
        35                  40                  45

Gln Arg Leu Thr Asn Leu Glu Lys Lys Ile Thr Asn Val Thr Thr Lys
    50                  55                  60

Phe Glu Gln Ile Glu Lys Cys Cys Lys Arg Asn Asp Glu Val Leu Phe
65                  70                  75                  80

Arg Leu Glu Asn His Ala Glu Thr Leu Arg Ala Ala Met Ile Ser Leu
                85                  90                  95

Ala Lys Lys Ile Asp Val Gln Thr Gly Arg Arg Pro Tyr Glu
            100                 105                 110
```

<210> 8
<211> 110
<212> PRT
<213> Variola virus

<400> 8

```
Met Asp Gly Thr Leu Phe Pro Gly Asp Asp Asp Leu Ala Ile Pro Ala
1               5                   10                  15

Thr Glu Phe Phe Ser Thr Lys Ala Ala Lys Lys Pro Glu Ala Lys Arg
            20                  25                  30

Glu Ala Ile Val Lys Ala Asp Gly Asp Asp Asn Glu Glu Thr Leu Lys
        35                  40                  45

Gln Arg Leu Thr Asn Leu Glu Lys Lys Ile Thr Asn Val Thr Thr Lys
    50                  55                  60

Phe Glu Gln Ile Glu Lys Cys Cys Lys Arg Asn Asp Asp Val Leu Phe
65                  70                  75                  80

Arg Leu Glu Asn His Ala Glu Thr Leu Arg Ala Ala Met Ile Ser Leu
                85                  90                  95

Ala Lys Lys Ile Asp Val Gln Thr Gly Arg Arg Pro Tyr Glu
            100                 105                 110
```

<210> 9
<211> 110
<212> PRT
<213> Variola virus

<400> 9

```
Met Asp Gly Thr Leu Phe Pro Gly Asp Asp Asp Leu Ala Ile Pro Ala
1               5                   10                  15

Thr Glu Phe Phe Ser Thr Lys Ala Ala Lys Lys Pro Glu Ala Lys Arg
            20                  25                  30

Glu Ala Ile Val Lys Ala Asp Gly Asp Asp Asn Glu Glu Thr Leu Lys
        35                  40                  45

Gln Arg Leu Thr Asn Leu Glu Lys Lys Ile Thr Asn Val Thr Thr Lys
    50                  55                  60

Phe Glu Gln Ile Glu Lys Cys Cys Lys Arg Asn Asp Asp Val Leu Phe
65                  70                  75                  80

Arg Leu Glu Asn His Ala Glu Thr Leu Arg Ala Ala Met Ile Ser Leu
```

85 90 95

Ala Lys Lys Ile Asp Val Gln Thr Gly Arg Arg Pro Tyr Glu
100 105 110

<210> 10
<211> 110
<212> PRT
<213> Artificial

<220>
<223> Consensus sequence for SEQ ID NOs. 6-9

<400> 10

Met Asp Gly Thr Leu Phe Pro Gly Asp Asp Asp Leu Ala Ile Pro Ala
1 5 10 15

Thr Glu Phe Phe Ser Thr Lys Ala Ala Lys Lys Pro Glu Ala Lys Arg
20 25 30

Glu Ala Ile Val Lys Ala Asp Gly Asp Asp Asn Glu Glu Thr Leu Lys
35 40 45

Gln Arg Leu Thr Asn Leu Glu Lys Lys Ile Thr Asn Val Thr Thr Lys
50 55 60

Phe Glu Gln Ile Glu Lys Cys Cys Lys Arg Asn Asp Asp Val Leu Phe
65 70 75 80

Arg Leu Glu Asn His Ala Glu Thr Leu Arg Ala Ala Met Ile Ser Leu
85 90 95

Ala Lys Lys Ile Asp Val Gln Thr Gly Arg Arg Pro Tyr Glu
100 105 110

<210> 11
<211> 185
<212> PRT
<213> Vaccinia virus

<400> 11

Met Met Thr Pro Glu Asn Asp Glu Glu Gln Thr Ser Val Phe Ser Ala
1 5 10 15

Thr Val Tyr Gly Asp Lys Ile Gln Gly Lys Asn Lys Arg Lys Arg Val

```
            20                  25                  30

Ile Gly Leu Cys Ile Arg Ile Ser Met Val Ile Ser Leu Leu Ser Met
        35                  40                  45

Ile Thr Met Ser Ala Phe Leu Ile Val Arg Leu Asn Gln Cys Met Ser
    50                  55                  60

Ala Asn Glu Ala Ala Ile Thr Asp Ala Ala Val Ala Val Ala Ala Ala
65                  70                  75                  80

Ser Ser Thr His Arg Lys Val Ala Ser Ser Thr Thr Gln Tyr Asp His
                85                  90                  95

Lys Glu Ser Cys Asn Gly Leu Tyr Tyr Gln Gly Ser Cys Tyr Ile Leu
            100                 105                 110

His Ser Asp Tyr Gln Leu Phe Ser Asp Ala Lys Ala Asn Cys Thr Ala
        115                 120                 125

Glu Ser Ser Thr Leu Pro Asn Lys Ser Asp Val Leu Ile Thr Trp Leu
    130                 135                 140
```